

testing the circuit board, wherein heat is removed by the thermal solution from a processor located in the package; and
removing the thermal solution attachment mechanism from the circuit board.

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on July 25, 2002, and the references cited therewith.

Claims 2, 6, 11, 19, 24, 25 and 29 are amended; as a result, claims 1-33 are now pending in this application.

The specification and drawings have been amended for clarification. No new matter has been added as a result.

The claims have also been amended for clarification, and such amendments are not intended to limit the scope of equivalents to which any claim element may be entitled. The amendments to the claims have support throughout the specification. No new matter has been added as a result. Applicants respectfully request reconsideration of the above application in view of the amendments and the remarks that follow.

Drawings

The Examiner objected to the drawings under 37 CFR 1.83(a) for the reasons stated above.

The Applicant is providing herewith a new drawing, "Figure 9" as described above.

The drawings are in compliance with 37 CFR 1.83(a). Reconsideration and withdrawal of this objection is respectfully requested.

Claim Objections

Claim 6 was objected to because the word "sizeable" in claim 6 should be substituted with the word "slidable." Applicant has amended claim 6 to correct this inadvertent error.

Claim 11 was objected to because the term “hard-mounted” was not used or explained in the specification. The term “hard-mounted” was used in the specification at page 14, lines 8-10, and is commonly understood in the art to refer to a fixed, permanent, mounting. The specification further clarified that such a mounting was to be distinguished from screwing the thermal solution into place. The claim language in question, when analyzed in light of the content of the application disclosure, is not indefinite, and no amendment is necessary. However, in an effort to facilitate prosecution, Applicant has amended claim 11 to recite “permanently mounted.”

Claim 24 was objected to because the term “bench top fixtures” was not used or explained in the specification. The term “bench top fixture” was used in the specification at page 12, line 8-10, and is commonly understood in the art to refer to a tool typically mounted to a table (i.e., bench) on an assembly line in the assembly and test area. Those skilled in the art understand that the term “bench top fixture” is a reference to an in-circuit test (ICT) fixture. The claim language in question, when analyzed in light of the content of the application disclosure, is not indefinite, and no amendment is necessary. However, in an effort to facilitate prosecution, Applicant has amended claim 24 to clarify that the backing plate and connectors are “integrated into a bench top fixture.”

Claim 25 was objected to because of the phrase “placing a mounting plate on top of a circuit board.” The Examiner suggested the replacement phrase, “placing a mounting plate on top of a processor.” Applicant has amended claim 25 in the manner requested, further clarifying that the processor is located on a top surface of the circuit board.

Reconsideration and withdrawal of the objections to claims 6, 11 and 24-25 is respectfully requested.

§112 Rejection of the Claims

Claims 1 and 25 were rejected under 35 USC § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Examiner states that neither the description nor the drawings describe or show the connectors have the first end attached to the mounting plate and the second end securable to the circuit board.

The specification does contain a description of this embodiment. For example, see the second complete paragraph beginning on page 9, line 11 and the second complete paragraph beginning on page 16, line 14. Furthermore, Figure 9 has been added to clarify this particular subject matter. Applicant further notes that claim 1 recites that the first end *is attachable* to the mounting plate.

Reconsideration and withdrawal of this rejection is respectfully requested.

§102 Rejection of the Claims

Claims 1-6, 14 and 19-33 were rejected under 35 USC § 102(b) as being anticipated by Kehley et al.

The Examiner states that Kehley discloses an apparatus for attaching a passive thermal solution to a circuit board and to a package.

In contrast, claims 1,6, 14 and 19-28, as amended, each recite a mounting plate having a mounting plate opening designed to allow the thermal solution to contact a processor. Claims 29-33, as amended, also recite a thermal solution secured to an opening in the first plate.

Kehley does not teach each element of claims 1-6, 14 and 19-33 because it does not teach a mounting plate having a mounting plate opening designed to allow the thermal solution to contact a processor or a thermal solution secured to an opening in the plate.

Kehley does not anticipate the claims, as amended. Applicant respectfully submits that the claims 1-6, 14 and 19-33 are allowable in their present form and notification to that effect is respectfully requested.

§103 Rejection of the Claims

Claims 15-18

Claims 15-18 were rejected under 35 USC § 103(a) as being unpatentable over Kehley et al. The Applicant respectfully traverses this rejection.

The Examiner states that, regarding claims 15-17, Kehley teaches the limitations except for the range of sizes of a circuit board and cooling structure, and that discovering optimum or workable ranges involves only routine skill in the art. Regarding claim 18, the Examiner states that Kehley teaches all the limitations of the claim except the materials selected for the mounting plate, backing plate and connector and that it would have been obvious to make these parts from a group consisting of aluminum, steel and plastic, since this is a matter of obvious design choice.

The Applicant respectfully traverses the Examiner's conclusions and requests that the Examiner provide a reference in support of these assertions or withdraw this rejection (See MPEP 2144.03). Even if such range of sizes and materials were well known, that still does not teach or suggest every element of the claim.

Applicant respectfully submits that the Examiner has not established *prima facie* obviousness of the present claims. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the cited references themselves or in the knowledge generally available to an art worker, to modify the reference or to combine reference teachings so as to arrive at the claimed invention. Second, the art must provide a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim limitations. In re Ochiai, 37 USPQ2d 1127 (Fed. Cir. 1997) (When evaluating the scope of a claim, every limitation in the claim must be considered).

Further, the additional limitations provided in dependent claims 15-18, cannot by themselves be rendered obvious over the cited references if the independent claim from which the claim depends is determined to be nonobvious. As claims 15-18 depend from and further define claim 1, claims 15-18 are believed to be allowable.

Kehley does not teach or suggest the claimed invention. Kehley discusses a socket that connects electronic components, such as integrated circuit modules with arrays of solder balls or columns, lands, pads of similar contact to other components, typically substrates such as printed circuit boards.

In contrast, claim 1, from which claims 15-18 depend, recites an apparatus for attaching a thermal solution to a circuit board comprising a mounting plate having a mounting plate opening designed to allow the thermal solution to contact a processor, the processor located on the circuit board; and a connector having a first end and a second end, the first end attachable to the

mounting plate and the second end securable to the circuit board, the connector designed to keep the mounting plate in contact with the processor.

Applicant respectfully submits that claims 15-18 are patentably distinct from Kehley. Claims 15-18, each viewed as a whole, are not suggested by the cited references and not obvious under 35 U.S.C. 103. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 7-13

Claims 7-13 were rejected under 35 USC § 103(a) as being unpatentable over Kehley et al. in view of McCullough et al. The Applicant respectfully traverses this rejection.

Regarding claims 7-9 and 11-12, the Examiner states that Kehley teaches all the limitations except the heat sink having a threaded base engageable with threads in the mounting plate opening, and that McCullough teaches an apparatus for attaching a thermal solution to a circuit board and to a package. The Examiner concludes that it would have been obvious to one skilled in the art to employ a heat sink screwed in a mounting plate as it is shown in McCullough in the device by Kehley in order to simplify assembling and disassembling the device. Regarding claims 10 and 13, the Examiner states that Kehley teaches all the limitations of the claims except the pressure imparted to the processor and that it would have been obvious to use such a range of pressures on the processor and that discovering such optimum or workable ranges involves only routine skill in the art.

Applicant again respectfully submits that the Examiner has not established the *prima facie* obviousness of the present claims.

Again, claims 7-13 are dependent on claim 1. The additional limitations provided in dependent claims 7-13 cannot by themselves be rendered obvious over the cited references if the independent claim from which it depends is determined to be nonobvious.

As discussed above, Kehley does not teach or suggest the claimed invention.

McCullough does not overcome the deficiencies of the primary reference. McCullough discusses a heat dissipating device that can provide multiple levels of pressure to a semiconductor package, having an outer peripheral ceramic region and an inner silicon region.

In contrast, claim 1, from which claims 13-17 depend, recites an apparatus for attaching a thermal solution to a circuit board with the elements as noted above.

Additionally, there is simply no suggestion *as to the desirability*, either in the cited references themselves or in the knowledge generally available to an art worker, of modifying the references as described or to combine the reference teachings as suggested for all of the reasons stated above. See In Re Sang Su Lee, No. 00-1158 (Serial No. 07/631,240), (Fed. Cir.), decided January 18, 2002 (attached hereto). The devices in each of the references cited are fundamentally different from each other and such critical differences must be recognized. Applicant requests the Examiner to either provide evidence of such motivation or withdraw this rejection.

Furthermore, there is no indication in either reference of the problem being solved by Applicant's invention. It is simply not clear that the prior art can be modified in the manner suggested by the Examiner, although the mere fact that the prior art may be modified in this manner does not make the modification obvious unless the prior art suggested the desirability of the modification. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988).

The references neither independently, or combined, contain each and every element of Applicant's claimed invention. Applicant respectfully submits that claims 7-13 are patentably distinct from Kehley et al in view of McCullough, either alone or in combination. Claims 7-13, each viewed as a whole, are not suggested by the cited references and not obvious under 35 U.S.C. 103. Reconsideration and withdrawal of this rejection is respectfully requested.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney Barbara Clark at 515/233-3865 or the below signed attorney to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/872,628

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Title: REUSABLE THERMAL SOLUTION ATTACHMENT MECHANISM AND METHODS OF USING SAME

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Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 12 day of November, 2002.

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